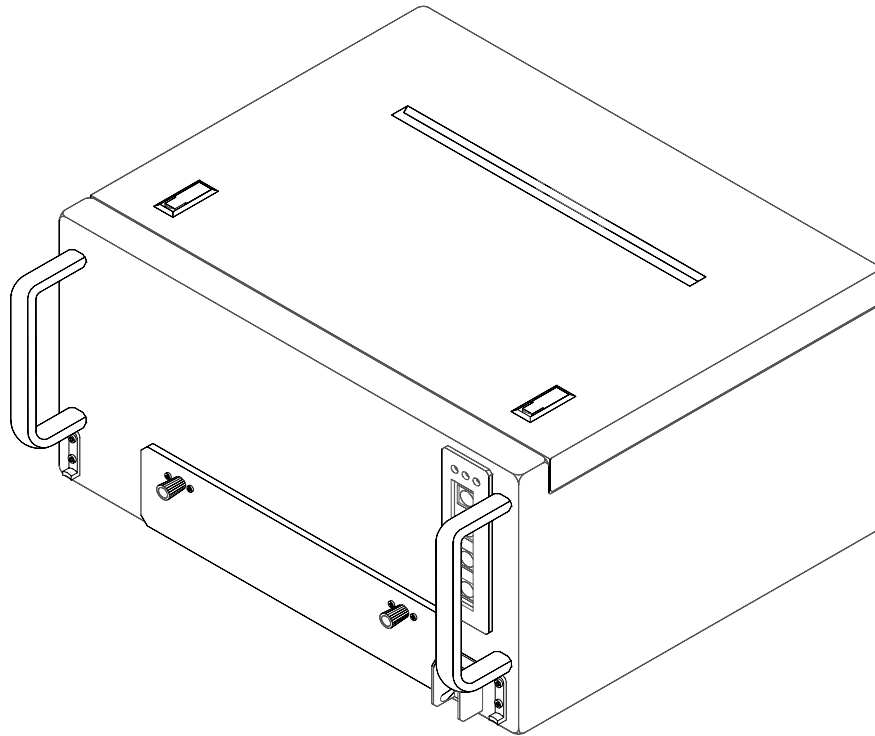


Model 2200

Dot Matrix Printer

(24 VDC & 110/220VAC with Parallel Interface)

Operation and Maintenance Manual



200075-406

DataMetrics Corporation
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This manual is intended to function as an example ONLY and does not represent all configurations and options for this product.

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RECORD OF CHANGES

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1. GENERAL INFORMATION

1.1. Introduction

This manual provides information and instructions required for the operation and maintenance of the Model 2200 Dot Matrix Printer manufactured by DataMetrics Corporation.

1.2. Applicable Documents

Military Standards

MIL-STD-461C	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-810D	Environmental Test Methods

Commercial Standards

IEC 1000-4-2	Electrostatic Discharge Immunity Test
IEC 1000-4-4	Electrical Fast Transient/Burst Immunity Test

1.3. Printer Description

The Model 2200 Dot Matrix Printer is a ruggedized, general-purpose dot matrix printer that is configured in a single enclosure. The equipment is packaged using environmental management techniques that protect internal components from shock, vibration, temperature extremes, and EMI/RFI. The chassis is configured with a mechanically isolated vehicle mounting adapter. The printer includes the following primary functional elements:

- Power subsystem
- Printing subsystem
- Control panel
- Ethernet subsystem
- External interfaces

1.3.1. Power Subsystem

The Model 2200 Dot Matrix Printer operates with 24 VDC & 110/220 VDC input power. The power subsystem includes a power protection circuit, EMI filter, power switch/circuit breaker, and power supply.

1.3.2. Printing Subsystem

The Model 2200 Dot Matrix Printer incorporates a Panasonic Model KX-P2130 dot matrix print engine that provides letter quality (30 x 24 dpi) resolution with a minimum print speed of 56 cps. Print speeds up to 250 cps are supported in draft mode. The printer controller includes a 14 Kbyte buffer that is expandable to 46 Kbyte. The printer may be operated with any host computer that supports Windows or DOS operating environments.

The printer supports Epson LQ-860 and IBM Proprinter X24E emulation with a variety of fonts and character sets. Printing is accomplished in bi-directional mode. The printer utilizes tractor-fed fan-fold paper that is stored in a removable tray. Printed paper exits the chassis through an aperture in the top cover of the unit. The printer supports paper with a width of 4 to 11.7 inches and length of 5 to 14.3 inches.

1.3.3. Control Panel

The control panel is located at the printer front panel. This panel is the operator interface for print operations other than those controlled from the host computer. Controls and indicators are described in Chapter 3.

1.3.4. External Interfaces

The rear panel of the Model 2200 Dot Matrix Printer includes connectors for prime power and the host computer data interface. A chassis ground lug is located on the rear panel below the power connector. The printer incorporates a Centronics parallel data interface. External connector assignments are identified in Chapter 2.

1.4. Specifications

Equipment specifications for the Model 2200 Dot Matrix Printer are defined in Tables 1-1 through 1-4.

1.5. Options

The standard printer memory buffer (14 Kbytes) may be increased to 46 Kbytes by incorporation of a 32 K expansion buffer chip.

Table 1-1. Physical Specifications

Characteristic	Description
Dimensions ⁽¹⁾	43 cm wide x 25 cm high x 33.7 cm deep
Weight ⁽¹⁾	14.5 kg

⁽¹⁾ Including vehicle-mounting adapter.

Table 1-2. Electrical Specifications

Characteristic	Description
Input Voltage	24VDC & 110/220 VAC
Output Current	
5 Vdc	2 A
39 Vdc	6 A
Power Consumption	28/74 W ⁽¹⁾

⁽¹⁾ Idle/active printing mode.

Table 1-3. Environmental Specifications

Characteristic	Description
Temperature	
Operating	-25 to 55°C
Non-operating	-30 to 71°C
Relative humidity (non-condensing)	Up to 90%
Altitude (operating)	3,000 m
Vibration (operating)	MIL-STD-810D, Figure 514.3-10 through 514.3-22.
Shock	
Non-operating	20 g, 6 ms
Operating	15 g, 6 ms
EMI/EMC	MIL-STD-461C, Part 4, Methods RE02, RS03, and RS05. IEC 1000-4-2, Level 3 IEC 1000-4-4, Level 3

Table 1-4. Printer Performance Specifications

Characteristic	Description
Fonts Draft Letter quality	Pica, Elite, and Micron. Roman, Sans Serif, Courier, Prestige, Script, OCR-B, and Bold PS.
Character sets	96 regular and italic ASCII characters 33 international characters (14 countries and Legal set) 158 IBM-PC special characters 38 multilingual characters
Dot configuration Diameter Matrix Pitch	0.2 mm 9 x 24 (draft) and 30 x 24 (letter quality) Draft: 0.21 (horizontal) x 0.14 mm (vertical) Letter quality: 0.07 (horizontal) x 0.14 mm (vertical)
Characters per inch (dpi)/ per line (cpl)	Pica: 10 dpi/80 cpl Elite: 12 dpi/96 cpl Micron: 15 dpi/120 cpl Compressed: 17 dpi/137 cpl Elite compressed: 20 dpi/160 cpl Pica elongated: 5 dpi/40 cpl Elite elongated: 6 dpi/48 cpl Micron elongated: 7.5 dpi/60 cpl Compressed elongated: 8.5 dpi/68 cpl Elite compressed elongated: 10 dpi/80 cpl
Printing speed {characters per second (cps)} Micron Elite Pica	250 cps (draft) and 83 cps (letter quality) 200 cps (draft) and 67 cps (letter quality) 167 cps (draft) and 56 cps (letter quality)
Service life Printhead Ribbon	200 million strokes for black ribbon in draft mode 3 million characters for black ribbon in draft mode

2. INSTALLATION

2.1. Introduction

This chapter provides information and instructions required for installation of the Model 2200 Dot Matrix Printer. Information is included concerning unpacking, ribbon and paper installation, connection of external cabling, software installation, and storage.

2.2. Chassis Installation Configuration

The Model 2200 Dot Matrix Printer is designed for installation with a vehicle-mounting adapter. Chassis outline dimensions are identified in Figure 2-1. Installation dimensions for the vehicle-mounting adapter are shown in Figure 2-2.

2.3. Unpacking

Follow the steps listed below to unpack the printer and prepare the unit for installation. Packing materials should be retained for future use.

- a. Carefully remove the printer from the shipping container. Inspect the unit for any evidence of damage.
- b. Open the top cover of the printer and remove the plastic retainer from the print head carriage guide bar.

2.4. Ribbon Installation

Follow the procedure defined below to install a ribbon cassette in the Model 2200 Dot Matrix Printer. Refer to Figure 2-3.

- a. Open the top cover of the printer and power up the unit to center the ribbon carriage.
- b. Adjust the head gap lever to the "6" position.
- c. Rotate the knob on the ribbon cassette clockwise to remove any slack.
- d. Position the ribbon cassette over the print head. Angle the right-hand side of the ribbon cartridge down and position it under the retaining bracket. Ensure that the ribbon is located between the print head nose and the ribbon mask. Gently press down on the cassette until it snaps into place.
- e. Adjust the head gap lever for the thickness of paper used {1 (thin) to 6 (thick)}. A head gap setting of 2 or greater is recommended for normal operation.
- f. Close the top cover of the printer and power down the unit (if required).

2.5. Paper Installation

Follow the procedure defined below to install paper in the Model 2200 Dot Matrix Printer. Refer to Figure 2-3.

- a. Open the top cover of the printer.
- b. Adjust the head gap lever for the thickness of paper to be used {1 (thin) to 6 (thick)}. A head gap setting of 2 or greater is recommended for normal operation.

- c. Place the paper feed selector in the “tractor” position.
- d. Unlock the tractors by pulling the clamping levers forward.
- e. Slide the tractors to positions that match the paper width.
- f. Open the tractor covers.
- g. Place the fan-fold paper stack in the paper tray with the leading edge of the top sheet facing the rear of the tray. Slide the paper tray into the printer.
- h. From the top of the printer, grasp the leading edge of the paper under the print engine and route the paper over the tractors. Position the leading edge of the paper at the bottom of the platen.
- i. Align the paper sprocket holes on the tractor pins and close the tractor covers.
- j. Verify that the tractors are aligned so that the paper does not exhibit slack or tension.
- k. Lock the tractors by pushing the tractor clamping levers back.
- l. Power up the printer and press LOAD/PARK to advance the paper to the first print line. Close the top cover of the printer. Press and hold LF/FF to advance the paper through the paper egress slot in the top cover.

2.6. External Cable Installation

All external interfaces for the printer are located at the rear panel (Figure 2-4). External connector signal assignments are defined in Table 2-3. Perform the following steps to connect external cabling.

- a. Verify that the front panel circuit breaker is in the “off” position.
- b. Connect the system ground cable to the ground stud on the rear panel.
- c. Install the Centronics parallel data interface cable.
- d. Connect the power cable to the input connector on the rear panel.

CAUTION

VERIFY THAT THE POWER SOURCE IS 28 VDC ($\pm 10\%$).

2.7. Software Installation

The Model 2200 Dot Matrix Printer will operate with any Windows-based (3.x/95/98) computer. The software installation procedures defined in the following paragraphs are tailored for Windows 95/98 installation.

NOTE

PRINTER SOFTWARE IS PROVIDED ON 1.44 MB DISKETTES. IF THE HOST COMPUTER DOES NOT INCLUDE A DISKETTE DRIVE, THE SOFTWARE MUST BE TRANSFERRED TO THE HOST STORAGE MEDIA USING SUPPORT EQUIPMENT THAT INCLUDES A DISKETTE DRIVE.

Follow the steps defined below to install the printer driver.

- a. Verify that the printer is connected to a Windows-based computer that is powered up and configured for normal operation.
- b. Verify that the printer is powered up and on line.
- c. At the Windows main screen of the host computer, select **Start – Settings - Printers**.
- d. Select **Add Printer** and then **Next**.
- e. In the Manufacturer column, select “Panasonic”.
- f. In the Printers column, select “Panasonic KX-P2130”.
- g. Insert the Panasonic Setup disk in the diskette drive and select **Have Disk**.
- h. Enter the directory path where the software resides and select **Ok** twice.
- i. Verify that “Panasonic KX-P2130” appears in the dialog box and select **Next**.
- j. Chose the port to be used (default LPT1:) and select **Next**.
- k. Enter a printer name (arbitrary designation).
- l. Chose a printer use designation (default/non-default) and select **Next**.
- m. Chose if a test page is desired and select **Finish**.

2.8. Setup Utility

Follow the steps defined below to configure operational parameters for the printer using the Setup Utility.

- a. Verify that a parallel interface cable is installed between a Windows-based host computer and the parallel port of the printer.
- b. Power up the host computer and printer. Verify that the printer is on line.
- c. At the Windows main screen of the host computer, select **Start – Run**.
- d. Insert the Setup disk in the diskette drive.
- e. Enter the directory path where the software resides and select **Ok**.
- f. Press the <RETURN> key or left mouse button at the setup introduction page.
- g. The Setup Utility includes the menus, submenus, and individual settings identified in Table 2-1. Function keys are identified in Table 2-2. Menu items and settings can be selected using the arrow keys or mouse. A selected item can be enabled using the <RETURN> key or left mouse button. Configure the printer with the required operational parameters using the Setup Utility.
- h. After all required setup parameters have been established, the current settings should be saved to a disk other than the original distribution media. Setup parameters are saved using the F3 function key.
- i. Power down the printer and host computer (if required).

Table 2-1. Setup Utility Menus

Menu	Submenu	Settings
Print Style	Font	Draft, Roman, Sans Serif, Courier, Prestige, Script, OCR-B, and Bold PS.
	Pitch	5, 6, 7.5, 8.5, 10, 12, 15, 17, 20 cpi, and Proportional.
Emulation	Epson	
	IBM	
Page Format	Lines per Inch	1, 1.5, 2, 2.5, 3, 4, 4.5, 5, 6, 7.5, 8, 9, 10, and 12 lpi.
	Page Length	5.5, 8, 8.5, 11, 11.66, 12, and 14 inches.
	Top Margin	0 to 2.5 inches.
	Bottom Margin	0 to 5.0 inches.
	Left Margin	0 to 78 columns ⁽¹⁾
	Right Margin	2 to 80 columns ⁽¹⁾
Print Mode	Center Printhead	Column 10 to 45.
	Graphic Direction	Bi-directional or Unidirectional.
Text Enhancement	Text Direction	Bi-directional or Unidirectional.
	Bold	Off/On
	Double Height	Off/On
	Double Strike	Off/On
	Double Wide	Off/On

⁽¹⁾ Setting of one margin affects the available parameters for the opposite margin.

Table 2-1. Setup Utility Menus

Menu	Submenu	Settings
Text Enhancement	Italics	Off/On
	Outline	Off/On
	Shadow	Off/On
	Zero Font	Normal, Point, or Slash.
Character Set	Country	U.S.A, France, Germany, U.K, Denmark1, Sweden, Italy, Spain1, Japan, Norway, Denmark2, Spain2, Latin America, Korea, and Legal.
	Character Set	Italic, Graphic1, and Graphic2.
	Code Page	U.S.A, Multilingual, Portugal, French Canadian, Norway, Turkey, BRASCII, and ABICOMP.
Install	AGM/IBM	Off/On
	Auto CR/IBM	Off/On
	Auto LF	Off/On
	Auto Loading	Off/On
	Paper Out Detect	Off/On
	Super Quiet Mode	Off/On
	Tear Off	Manual/Auto
	CSF Mode	Off/On
	Download	Off/On
	Color ⁽²⁾	Black, Magenta, Cyan, Violet, Yellow, Orange, and Green.
	Auto On Line	Off/On
Data Length	8 Bits/7 Bits	
TOF Setting	Tractor	0 to 5 inches.
	Friction	0 to 5 inches.
	Cut Sheet Feeder	0 to 5 inches.

⁽²⁾ The printer supports only monochrome printing.

Table 2-2. Setup Utility Function Keys

Key	Description	Function
F1	Help	Provides an explanation of each menu selection.
F2	Factory Setting	Restores all menu settings to the factory default.
F3	Save to Disk	Saves current menu settings to the specified path and filename.
F4	Load from Disk	Loads menu settings that were previously saved to disk.
F5	Print Setting	Prints a list of the current menu settings.
F6	List	Displays the current menu settings.
F10	Send to Printer	Downloads the current menu settings to the printer.
ESC	Exit	Exit the Setup Utility.

2.9. Limited Operation, Storage, and Transportation

If the printer is not operated for an extended period of time, the paper and ribbon should be removed and stored in a humidity-controlled environment. This provision is particularly important when the equipment is used in a high-humidity environment. If the printer is to be stored or transported, the unit should be packaged as originally shipped with the retainer installed on the printhead carriage guide bar (Figure 5-1). The printer can be stored or transported in any manner that is consistent with the environmental conditions identified in Table 1-3.

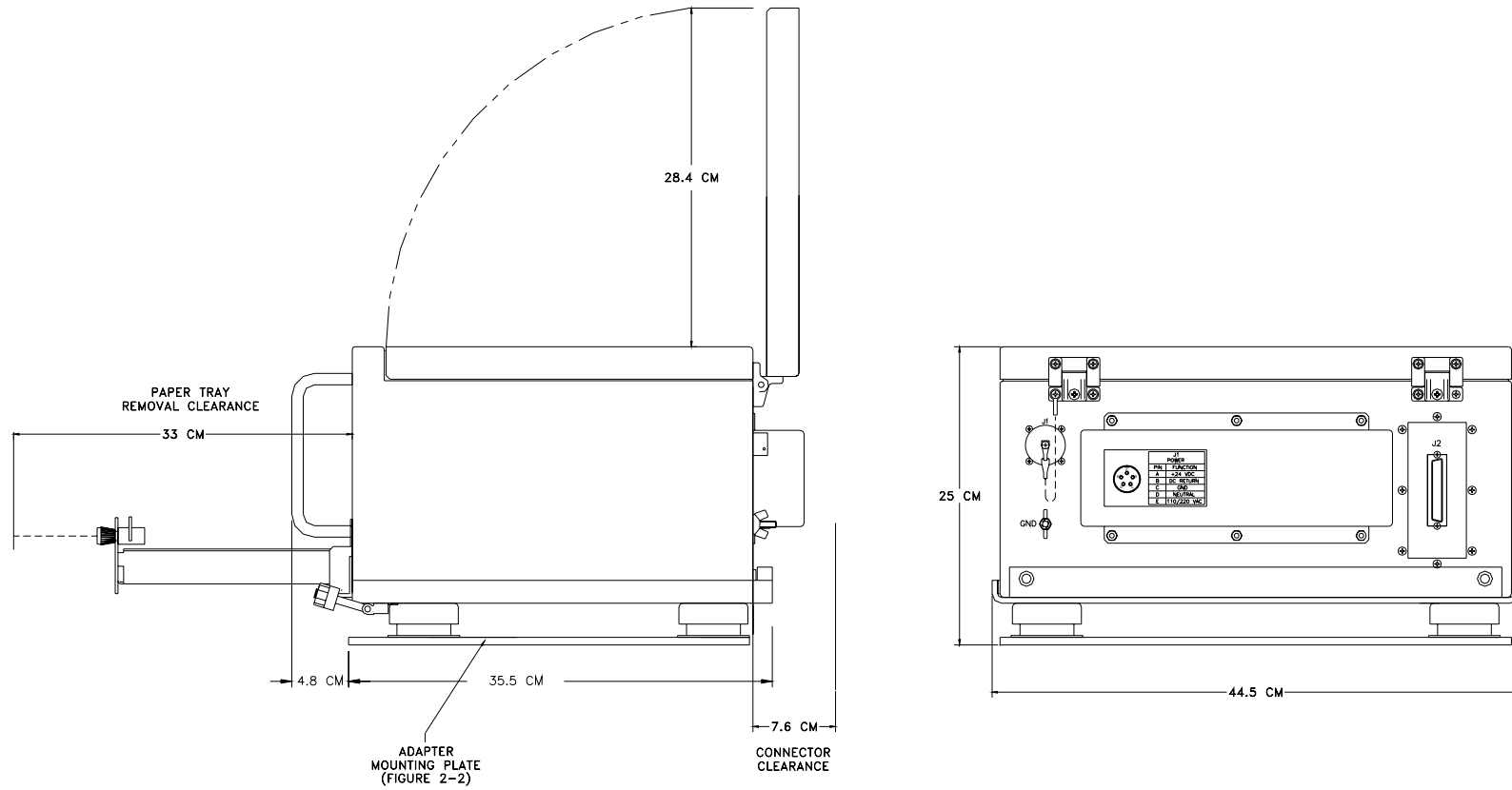
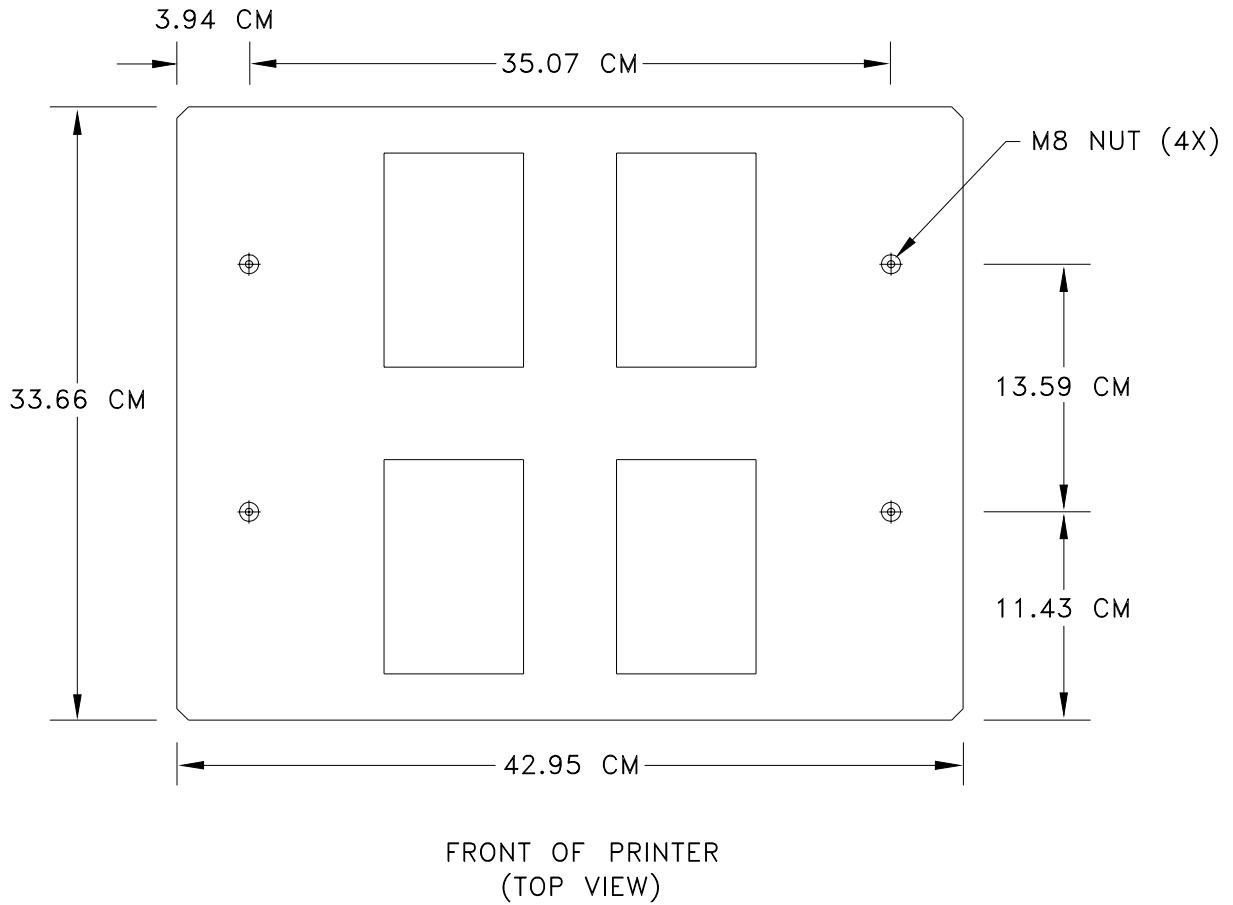
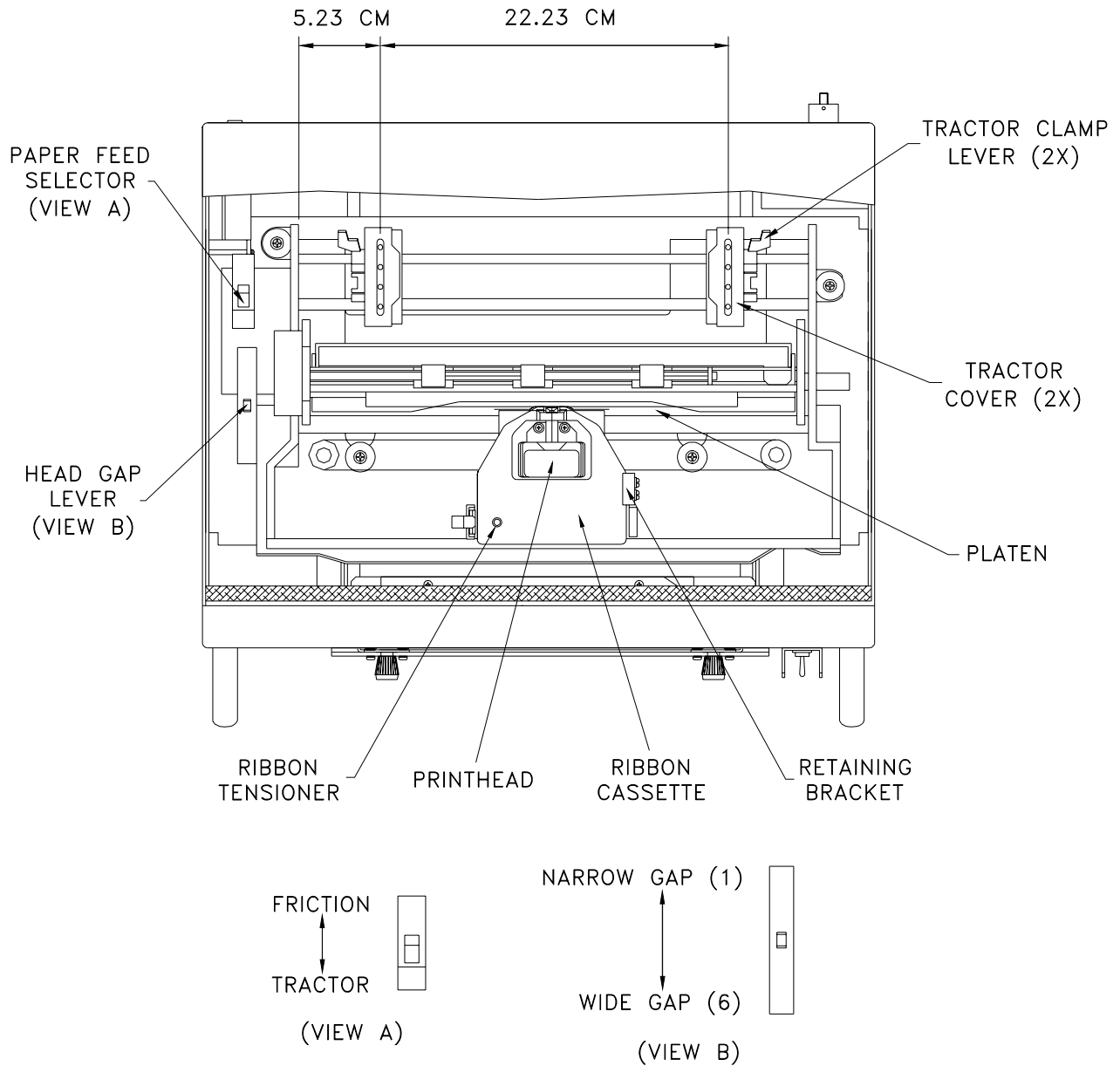


Figure 2-1. Installation Dimensions



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Figure 2-2. Vehicle Adapter Mounting Dimensions



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Figure 2-3. Ribbon and Paper Installation

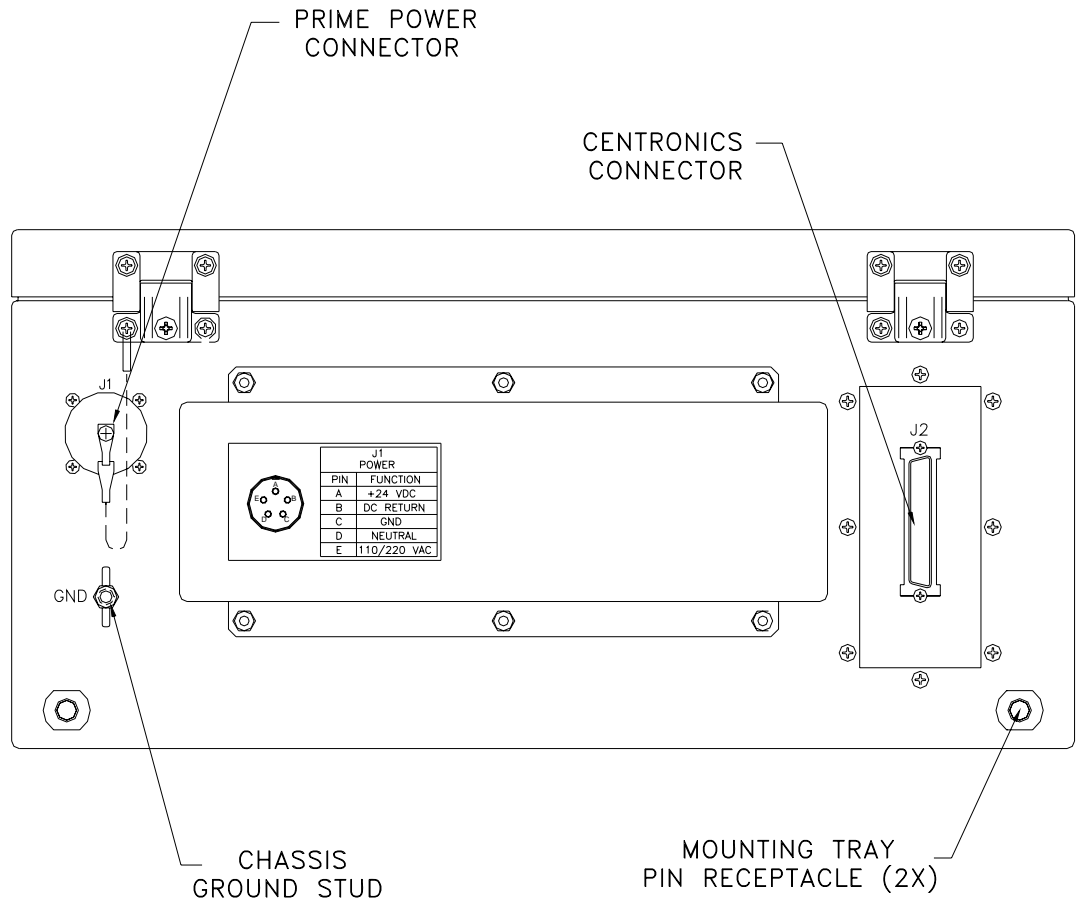


Figure 2-4. Rear Panel

Table 2-3. External Connectors

Connector	Function	Pin	Signal
J1	Prime power	A B C D E	+24 VDC DC RETURN GND NEUT AC IN
J2	Parallel Centronics Interface	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36	DATA STROBE* DATA BIT 1 DATA BIT 2 DATA BIT 3 DATA BIT 4 DATA BIT 5 DATA BIT 6 DATA BIT 7 DATA BIT 8 ACKNOWLEDGE* BUSY PAPER OUT SELECT AUTO FEED XT* Not used SIGNAL GROUND CHASSIS GROUND +5V DATA STROBE RETURN DATA BIT 1 RETURN DATA BIT 2 RETURN DATA BIT 3 RETURN DATA BIT 4 RETURN DATA BIT 5 RETURN DATA BIT 6 RETURN DATA BIT 7 RETURN DATA BIT 8 RETURN ACKNOWLEDGE RETURN BUSY RETURN PRIME RETURN* PRIME* ERROR* SIGNAL GROUND Not used Not used SELECT IN*

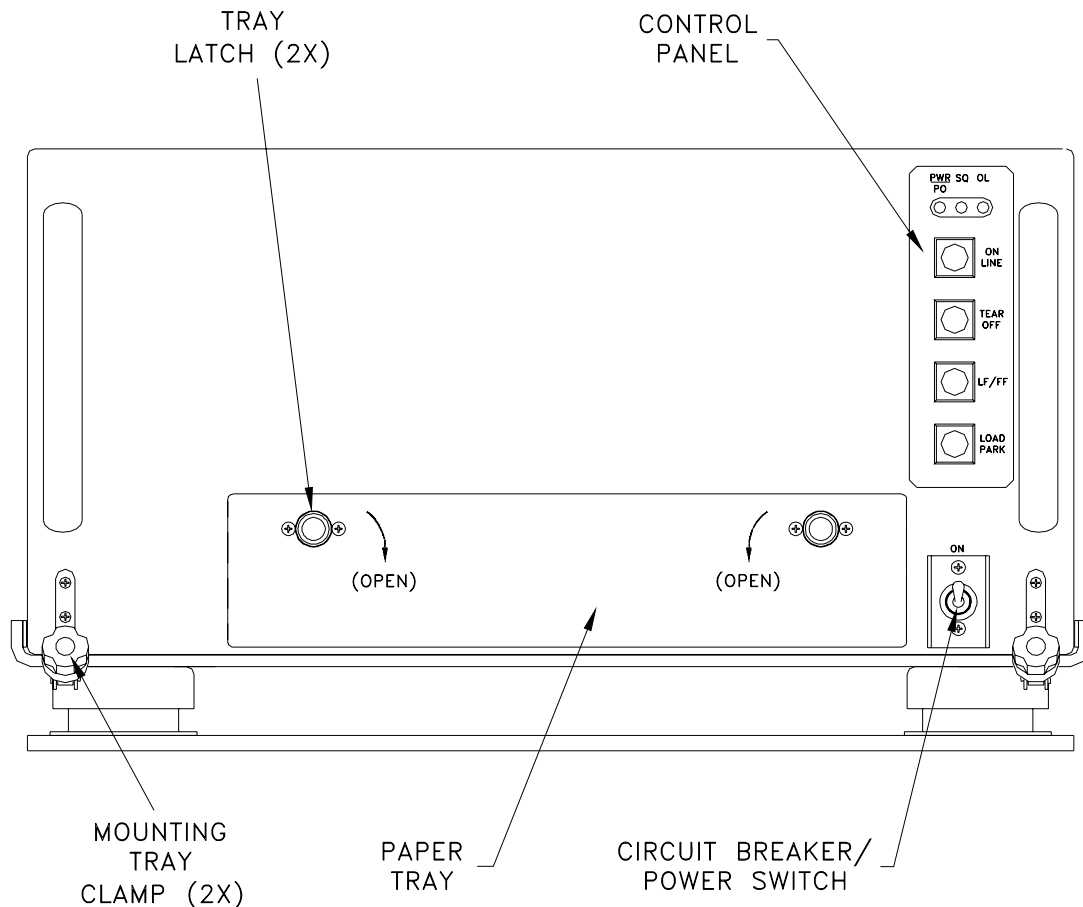
3. OPERATION

3.1. Introduction

This chapter provides information concerning printer controls and indicators, test printing, normal operation, error conditions, and shutdown. Before the unit is powered up for the first time, verify that the installation procedures defined in Chapter 2 have been performed.

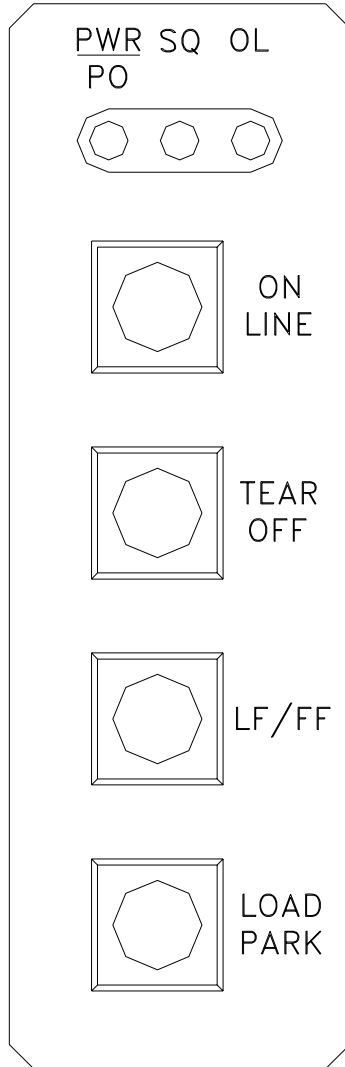
3.2. Controls and Indicators

All controls and indicators required for operation of the Model 2200 Dot Matrix Printer are located at the front panel of the unit (Figure 3-1). Control panel switches and indicators are shown in Figure 3-2. Controls and indicators are described in Table 3-1.



200075-404

Figure 3-1. Front Panel



800028-101

Figure 3-2. Control Panel

Table 3-1. Controls and Indicators

Identification	Description	Function
	Circuit breaker switch	When placed in the “on” position, prime power is applied to the printer.
ON LINE	Momentary pushbutton switch	When pressed, the printer toggles to the on line/off line state.
TEAR OFF	Momentary pushbutton switch	When pressed, paper is advanced to the “tear” position. When the switch is pressed a second time, paper advances to the first print line. Note that this function is usable only when the top cover of the printer is open.
LF/FF	Momentary pushbutton switch	When pressed once, the paper advances one line. When held in the depressed position, the printhead is centered and the paper is advanced to the top of the next page. When pressed in conjunction with the ON LINE switch, paper advances one micro line (1/180”). When pressed in conjunction with the LOAD PARK switch, paper reverses one micro line (1/180”). When LF/FF and ON LINE/LOAD PARK are held in the depressed position, the paper will continue advancing/reversing until the switches are released. If released within 5 inches of the top of the page, the position will be stored as the “top of form”.
LOAD PARK	Momentary pushbutton switch	When pressed the first time after the unit is powered up, paper advances to the first print line. When pressed a second time, the paper reverses to the “park” position.
<u>PWR</u> PO	Indicator	Illuminates steadily when prime power is applied; indicator blinks when the paper supply is exhausted. Note that when a paper-out condition occurs while a page is being printed, press ON LINE repetitively to continue printing to the end of the page.
SQ	Indicator	Illuminates when the Super Quiet mode is enabled. Super Quiet mode is enabled/disabled by simultaneously pressing the ON LINE and TEAR OFF switches.
OL	Indicator	Illuminates when the printer is in the on-line state.

3.3. Self Test

3.3.1. Printer

The self-test function will print 5 lines of each resident font and then print the draft font for approximately 20 minutes. The self-test function is initiated by activating the prime power switch while pressing the LF/FF switch. The test sequence can be terminated prior to completion by powering down the printer.

3.4. Normal Operation

Follow the instructions defined below to operate the printer under normal conditions.

- a. Power-up the host computer.
- b. Place the printer power switch in the “on” position, and verify that the control console PWR indicator is illuminated.
- c. The printer can be configured to enter the on-line state manually or automatically using the Setup Utility (Table 2-1). Once the printer has achieved an on-line state, no manual intervention is required to conduct routine print tasks. Operational parameters are not affected by normal power on/off cycles.

3.4.1. Stopping a Print Job

A print job can be terminated from the host computer or at the printer control panel. Place the printer off line to stop a print job from the control panel. Cycling printer power can clear unprinted data in the buffer. If power is not cycled, the print job will continue when the printer is returned to the on-line state.

3.5. Error Conditions

Refer to Chapter 5 for information concerning printer troubleshooting and corrective action.

3.6. Shutdown

It is not necessary to power down the printer when the unit is not used for limited periods. When the printer is to be taken out of service, perform the following shutdown sequence:

- a. Ensure that the printer is not receiving data from the host computer.
- b. Place the printer power switch in the “off” position.

4. FUNCTIONAL DESCRIPTION

4.1. Introduction

This chapter describes the major functional elements of the Model 2200 Dot Matrix Printer. Information is provided concerning power distribution, the printing subsystem, Ethernet subsystem, control panel, and heaters. Chassis interconnections are identified in Figure 4-1.

The Model 2200 Dot Matrix Printer provides dot matrix hardcopy output of data received from a host computer. The printer communicates with a host computer through a Parallel Data interface. The mechanical and electrical subsystems of the printer are described in the following paragraphs.

4.1.1. Power Distribution

Prime power (+28 Vdc) enters the chassis at the rear panel J1 connector. Power is sent through a transient protection circuit that prevents equipment damage or performance degradation if a voltage spike or dropout condition is incurred. An EMI filter provides attenuation of interference related to input voltage and output current. Prime power exits the filter and is routed to a 5-ampere circuit breaker/power switch at the front panel. The load side of the circuit breaker provides dc power to the power supply input connector. The power supply converts +28 Vdc input to outputs of +5 V at 2 A and 39 V at 6 A. Power supply outputs are provided to the controller board, 12 V converter, and heaters. A chassis ground stud is located on the rear panel of the unit.

4.1.2. Printing Subsystem

The Model 2200 Dot Matrix Printer incorporates the printing architecture of the Panasonic Model KX-P2130 printer. The printing subsystem consists of a controller board and print engine mechanics. The controller board receives +5 V and +39 V from the power supply. Power and data signals are provided by the controller board to the print engine mechanics, and control panel interface.

4.1.3. Control Panel

All controls and indicators required for printer operation are located at the front panel of the unit. The switch/indicator panel communicates with the printer controller through a control panel interface board. The circuit breaker/power switch interfaces with the EMI filter and power supply. Printer controls and indicators are described in Chapter 3.

4.1.4. Heaters

The Model 2200 Dot Matrix Printer incorporates a heating capability to facilitate operation at low temperature. A controlled heat source is provided for the two print engine drive motors. The heat source consists of a 50-watt resistor mounted under each motor. A thermal switch is used to apply power to the resistors at $\leq -15^{\circ}\text{C}$ and remove power at $\geq 0^{\circ}\text{C}$.

Figure 4-1. Chassis Interconnections

5. MAINTENANCE

5.1. Introduction

This chapter provides information and instructions concerning Model 2200 Dot Matrix Printer tools and test equipment, periodic maintenance, fault isolation, and the removal and installation of replaceable components and subassemblies.

5.2. Tools and Test Equipment

The following tools and test equipment are required to maintain the printer:

- Common hand tools
- Digital Multimeter
- Host computer with Parallel interface

5.3. Periodic Maintenance

5.3.1. Cleaning and Lubrication

The recommended frequency for cleaning and lubrication is dependent on the usage profile and installation environment. As a minimum, the following actions should be performed whenever the ribbon cassette is replaced.

- Wipe the printer interior with a soft cloth and mild commercial cleaner. The platen (Figure 5-1) should only be cleaned with denatured alcohol.
- Vacuum dust and paper particles from the chassis interior.
- Apply a small amount of very light oil to the carriage guide bar (Figure 5-1).

5.3.2. Ribbon Cassette Re-Inking

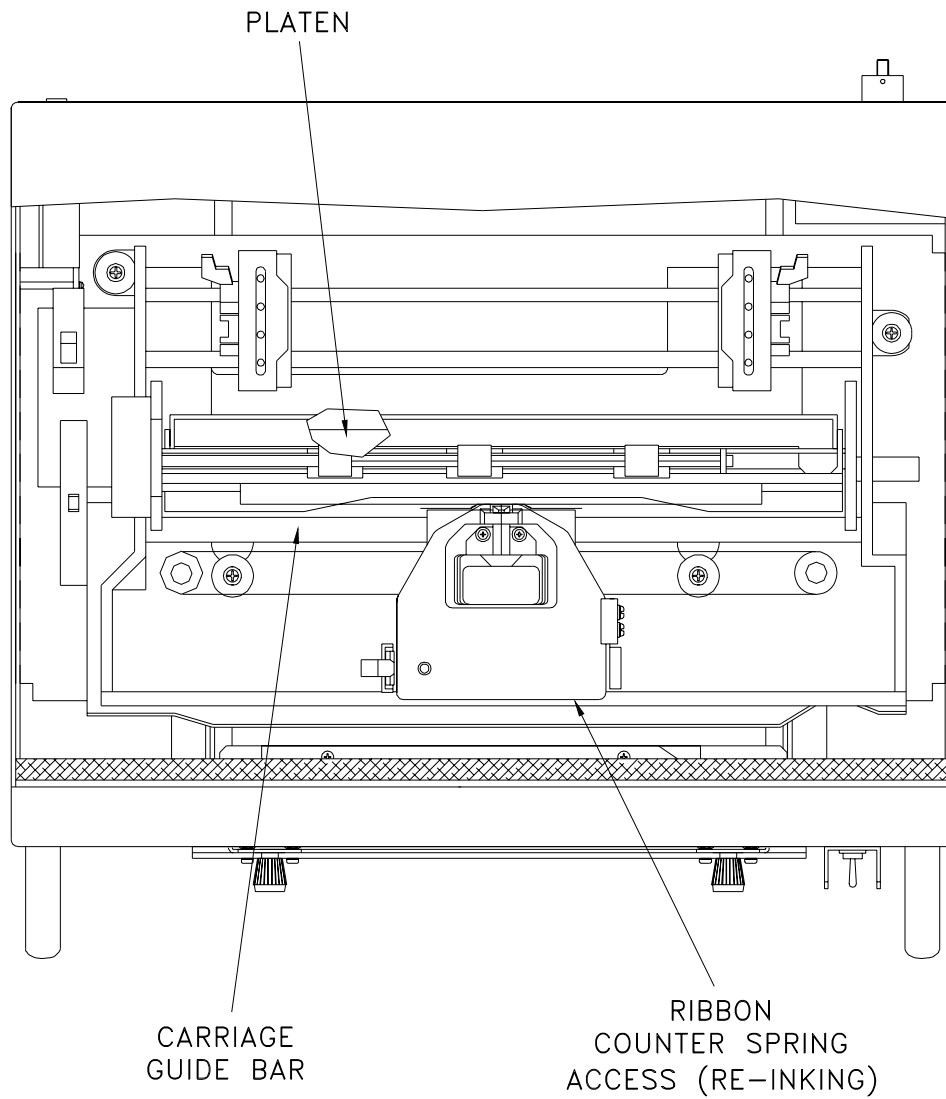
A black ribbon supports the printing of approximately 3 million characters in draft mode. When the print image begins to fade, the ribbon can be re-inked. Re-inking is accomplished by removing the cassette and gently pushing the ribbon counter spring (Figure 5-1) with a ballpoint pen or similar object. Reinstall the ribbon cassette and print a few test pages. If image quality does return to normal after a few pages are printed, the ribbon cassette should be replaced. The ribbon should not be re-inked unless the print image is fading.

5.4. Fault Isolation

If the printer exhibits an error condition or degraded performance, refer to the troubleshooting information provided in Table 5-1.

CAUTION

WHEN PERFORMING TROUBLESHOOTING OPERATIONS, ENSURE THAT GALVANIC SEPARATION IS MAINTAINED BETWEEN THE DC RETURN OF THE ETHERNET PRINT SERVER AND THE DC RETURN OF THE PRINTER POWER SUPPLY. FAILURE TO OBSERVE THIS PRECAUTION WILL RESULT IN DAMAGE TO THE PRINT SERVER.



200075-410

Figure 5-1. Periodic Maintenance Locations

Table 5-1. Fault Isolation

Fault Condition	Recommended Action
Ink smears or printout is faint.	Adjust head gap lever (Figure 2-3).
Printhead moves but does not print.	Verify that ribbon is installed correctly. Adjust head gap lever (Figure 2-3).
Power indicator (PWR) is illuminated but unit will not print.	Verify that printhead path is not blocked. If lengthy print operations were being performed, allow the unit to cool down.
Unexpected characters appear in printing.	Verify that emulation mode is set to Epson (Table 2-1).
Printout is double-spaced.	Disable Auto LF setting (Table 2-1).
The same line is repetitively printed.	Enable Auto LF setting (Table 2-1).
Incorrect character set prints.	Select the required character set per Table 2-1.
All ASCII characters cannot be printed.	Select the correct data length setting (Table 2-1).
Paper out indicator (PO) does not illuminate when paper supply is exhausted.	Enable Paper Out Detect setting (Table 2-1).
Printer will not power up.	Verify that input power is 24VDC OR 110/220VAC If input power is correct, verify that supply voltage is present at EMI filter input terminals. If voltage is not correct, replace transient protection circuit assembly. If voltage at EMI filter input a terminal is correct, verify that supply voltage is present at EMI filter output terminals. If voltage is not correct, replace EMI filter. With power cable disconnected and the circuit breaker closed, verify continuity across circuit breaker terminals. Replace the switch assembly if continuity is not present. Verify that voltage (5 V/39 V) is present at power supply output terminals. Replace power supply if voltage is not correct. If previous verifications are conducted successfully, replace the controller board.
Printer powers up but will not execute print operations.	Replace controller board. If problem remains, replace print engine assembly.
Control panel is inoperative.	Perform a sequential replacement of the control panel, control panel interface, and controller board.

Table 5-1. Fault Isolation

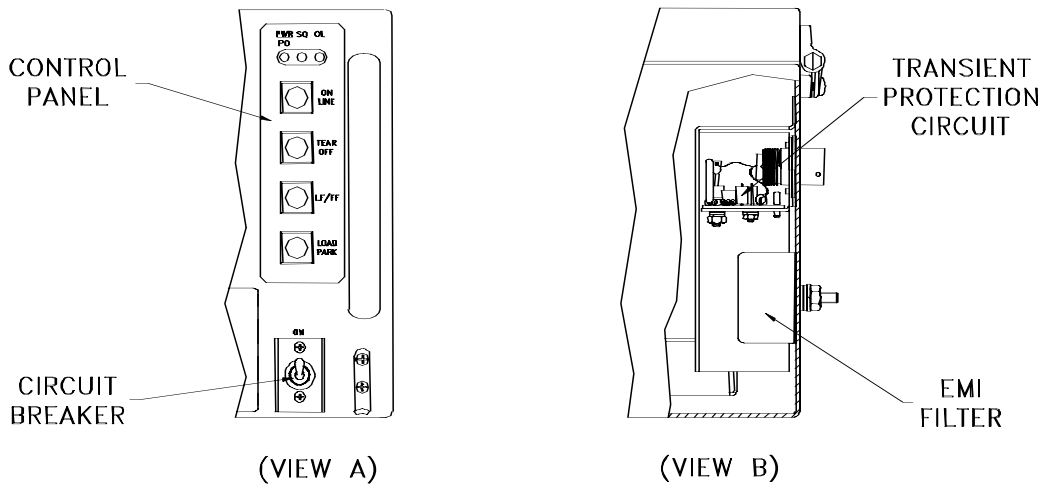
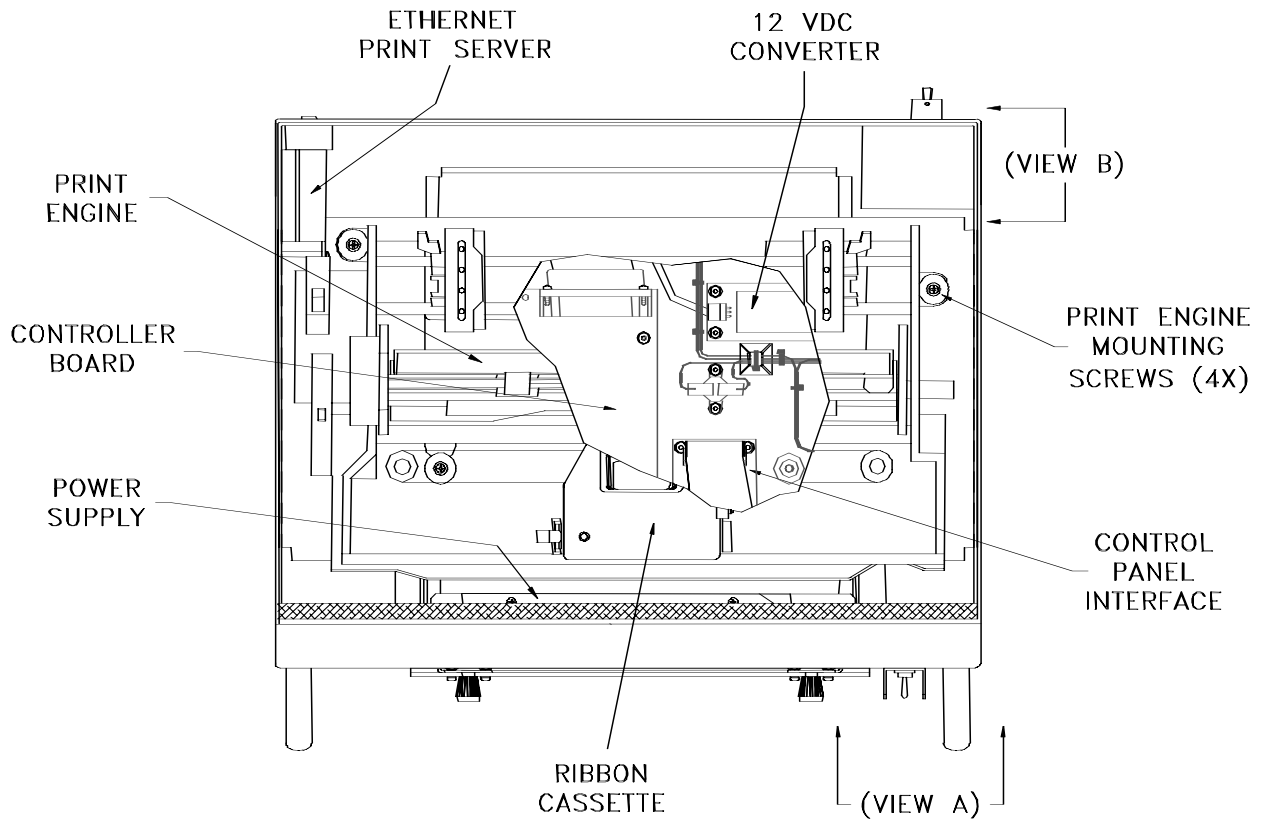
Fault Condition	Recommended Action
Printer self test is executed successfully (3.3.1) but print operations cannot be performed with data sent from a host computer.	<p>Verify that the software installation and setup procedures defined in Chapter 2 have been performed.</p> <p>Press the print server TEST button (Figure 3-3) and verify that a test page is printed successfully. If test page is not printed, replace the print server. If problem remains, replace the controller board.</p>

5.5. Replaceable Components and Subassemblies

The following paragraphs include information concerning the replaceable components and subassemblies identified in Table 5-2. Item locations are shown in Figure 5-2.

Table 5-2. Field Replaceable Units

Description	Part No.
Print Engine Assembly	
Control Panel Interface	
Converter	
Power Supply Assembly	
Transient Protection Circuit	
Ribbon Cassette	
Controller Board	
EMI Filter	
Circuit Breaker Assembly	
Control Panel	



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Figure 5-2. Replaceable Unit Locations

Note: This printer does not contain the 12VDC Converter or Ethernet Print Server.

CAUTION

THE PRINTHEAD CAN BECOME VERY HOT AFTER PERIODS OF CONTINUOUS OPERATION. AVOID CONTACT WITH THE PRINTHEAD DURING MAINTENANCE PROCEDURES.

NOTE

OBSERVE PRECAUTIONS RELATING TO ELECTROSTATIC DISCHARGE (ESD) WHEN HANDLING COMPONENTS THAT INCLUDE INTEGRATED CIRCUITRY.

5.5.1. Ribbon Cassette

Removal:

- a. Open the top cover of the printer and power up the unit to center the ribbon carriage.
- b. Move the head gap lever to the “6” position (Figure 2-3).
- c. Depress the tab on the left side of the ribbon cassette and remove the ribbon from the printer.

Installation:

- a. Rotate the knob on the new ribbon cassette clockwise to remove any slack.
- b. Position the ribbon cassette over the printhead. Angle the right-hand side of the ribbon cartridge down and position it under the retaining bracket. Ensure that the ribbon is located between the printhead nose and the ribbon mask. Gently press down on the cassette until it snaps into place.
- c. Adjust the head gap lever for the thickness of paper used {1 (thin) to 6 (thick)}. A head gap setting of 2 or greater is recommended for normal operation.
- d. Close the top cover of the printer and power down the unit (if required).

5.5.2. Print Engine

Removal:

- a. Open the top cover of the printer.
- b. Remove the four screws that secure the print engine assembly to the engine base plate.
- c. Lift the print engine assembly up far enough to disconnect the interface cables from the controller board. Remove the engine assembly from the chassis.

Installation:

- a. Lower the print engine assembly into the chassis and connect the interface cabling to the controller board.
- b. Position the engine assembly on the base plate mounting blocks and install the hardware that secures the print engine.
- c. Close the top cover of the printer.

5.5.3. Power Supply

Removal:

- a. Remove the print engine assembly per 5.5.2.
- b. Remove the DC+, DC-, and CHASSIS GROUND harness terminals from the power supply terminal block.
- c. Disconnect the power supply interface cable connectors for the controller board, 12 V converter, and heater harness.
- d. Remove the four nuts that secure the power supply mounting plate to the back of the chassis front panel. Remove the power supply assembly from the chassis.

Installation:

- a. Position the power supply assembly on the back of the chassis front panel and install the hardware that secures the assembly.
- b. Connect the power supply interface cable connectors to the controller board, 12 V converter, and heater harness.
- c. Install the DC+, DC-, and CHASSIS GROUND harness terminals on the power supply terminal block.
- d. Install the print engine assembly per 5.5.2.

5.5.4. Circuit Breaker Assembly

Removal:

- a. Remove the print engine assembly per 5.5.2.
- b. Remove the three screws that secure the EMI filter/transient protection circuit cover. Remove the cover from the chassis.
- c. Remove the two nuts that secure the EMI filter to the inside of the chassis rear panel.
- d. Remove the DC+ and DC- terminals of the circuit breaker harness from the EMI filter output (bottom) connections.
- e. Remove the CHASSIS GROUND terminal of the circuit breaker harness from the EMI filter ground connection.
- f. Remove the DC+, DC-, and CHASSIS GROUND terminals of the circuit breaker harness from the power supply terminal block.
- g. Remove the nut that secures the circuit breaker to the front panel of the printer. Remove the circuit breaker assembly from the chassis.

Installation:

- a. Position the circuit breaker switch on the front panel. Install the washer and nut that secure the switch to the panel.
- b. Install the DC+, DC-, and CHASSIS GROUND terminals of the circuit breaker harness on the power supply terminal block.

- c. Install the CHASSIS GROUND terminal of the circuit breaker harness on the EMI filter ground connection.
- d. Install the DC+ and DC- terminals of the circuit breaker harness on the EMI filter output (bottom) connections.
- e. Position the EMI filter on the chassis and install the hardware that secures the filter.
- f. Install the EMI filter/transient protection circuit cover.
- g. Install the print engine per 5.5.2.

5.5.5. Transient Protection Circuit

Removal:

- a. Disconnect the external power cable.
- b. Remove the three screws that secure the EMI filter/transient protection circuit cover. Remove the cover from the chassis.
- c. Remove the four screws that secure the transient protection circuit assembly to the rear panel of the chassis.
- d. Remove the DC+ and DC- terminals of the transient protection circuit from the input (top) EMI filter connections. Remove the protection circuit assembly from the chassis.

Installation:

- a. Install the DC+ (red) and DC- (black) terminals of the transient protection circuit assembly on the EMI filter input (top) connections.
- b. Position the protection circuit assembly on the rear panel and install the hardware that secures the module.
- c. Install the EMI filter/transient protection circuit cover.
- d. Connect the external power cable.

5.5.6. EMI Filter

Removal:

- a. Remove the print engine assembly per 5.5.2.
- b. Remove the three screws that secure the EMI filter/transient protection circuit cover. Remove the cover from the chassis.
- c. Remove the two nuts that secure the EMI filter to the inside of the chassis rear panel.
- d. Remove the input, output, and ground harness terminals from the EMI filter. Remove the EMI filter from the chassis.

Installation:

- a. Install the DC+ (red) and DC- (black) terminals of the transient protection circuit assembly on the EMI filter input (top) connections.
- b. Install the CHASSIS GROUND terminal of the circuit breaker harness on the EMI filter ground connection.
- c. Install the DC+ and DC- terminals of the circuit breaker harness on the EMI filter output (bottom) connections.
- d. Position the EMI filter on the chassis and install the hardware that secures the filter.
- e. Install the EMI filter/transient protection circuit cover.
- f. Install the print engine per 5.5.2.

5.5.7. Controller Board

Removal:

- a. Remove the print engine assembly per 5.5.2.
- b. Remove the control panel and parallel interface cables from the controller board.
- c. Remove the four nuts that secure the controller board to the print engine base plate. Remove the controller board from the chassis.

Installation:

- a. Position the controller board on the print engine base plate and install the hardware that secures the module.
- b. Install the control panel and parallel interface cables on the controller board.
- c. Install the print engine assembly per 5.5.2.

5.5.8. Control Panel Interface

Removal:

- a. Remove the print engine assembly per 5.5.2.
- b. Remove the interface cables from the control panel interface board.
- c. Remove the four nuts that secure the control panel interface board the print engine base plate. Remove the interface board from the chassis.

Installation:

- a. Position the control panel interface board on the print engine base plate and install the hardware that secures the module.
- b. Install the control panel interface board cables.
- c. Install the print engine assembly per 5.5.2.

5.5.9. Control Panel

Removal:

- a. Open the top cover of the printer.
- b. Disconnect the control panel interface cable.
- c. Remove the six nuts that secure the control panel to the back of the front panel. Remove the panel from the chassis.

Installation:

- a. Position the control panel on the faceplate-mounting studs at the back of the front panel.
- b. Install the hardware that secures the control panel.
- c. Connect the control panel interface cable.
- d. Close the top cover of the printer.